Crossons-Longview Forest Restoration Project Environmental Assessment

Fire/Fuels Specialist Report V3

South Platte Ranger District
Pike National Forest
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1. INTRODUCTION

The purpose of the Crossons-Longview Forest Restoration Project is to restore sustainable forest conditions that are resilient to fire, insects, and diseases, while providing for diverse wildlife habitats, recreational opportunities, and sustainable watershed conditions. The specific purposes of this project are:

- To reduce the potential of large-scale, high-intensity wildfire with uncontrollable fire behavior, such as active crown fire.
- To reduce the potential that a wildfire would negatively affect public water supplies from subsequent severe flooding and sedimentation.
- To improve forest health, vigor, and resilience to large-scale fire, insects and disease.
- To enhance wildlife habitat through the reduction of the potential for high-intensity wildfires, enhancement of shrublands and aspen habitat, and Pawnee montane skipper habitat.

2. PROJECT DESCRIPTION

The South Platte Ranger District of the Pike and San Isabel National Forest proposes to treat 9,574 acres within the 22,729 acre Crossons-Longview Project Area to move the montane forest ecosystem towards historic conditions. The proposed actions would alter forest stand and understory conditions and would be accomplished by a combination of mechanical harvesting and hand treatment. Specific actions would be dependent on site-specific conditions and the vegetation type; however, actions would include thinning, created openings, and prescribed burning. Professional judgment would be used, within guidelines identified in the Environmental Assessment and taking into consideration the terrain and vegetative type, to determine which one or combination of treatments are most appropriate for individual treatment sites. Approximately 55 percent of the treatment areas are located within 0.5 miles of existing roads, with 33 percent of those areas treated by hand due to slopes between 35-60 percent. Approximately 61 percent of the treatment areas lie on slopes of 0-35 percent and would be considered appropriate for treatment with traditional harvesting equipment and commercial product removal. The treatments on slopes between 35-60 percent would likely be hand treatments. Where possible, vegetation treatments would take into consideration previously treated areas and/or past burned areas in order to increase the overall landscape benefit.

The Proposed Action does not include the establishment of any new system roads, however, approximately 10 miles of temporary roads would be used to access the proposed action treatment areas. The target vegetation areas are identified on Table 1 and Figure 1. It is expected that project activities would take approximately 10 years to treat the proposed treatment area.

Table 1. Crossons-Longview Alternative B -Proposed Treatment Areas

Vegetation Type	Area (acres)	Percentage
Xeric Ponderosa pine	4,581	49%
Mesic Ponderosa pine	3,684	38%
Mixed Conifer	603	6%
Lodgepole pine	557	6%
Aspen	121	1%
Shrubs	28	<1%
Total	9,574	

ALTERNATIVE C

Alternative C was developed in response to a concern that increasing access through the use of temporary roads would cause some negative effects. Alternative C proposes that minimal temporary roads will be built to accomplish the project's purpose and need. Temporary roads would be limited to short segments needed to accomplish the treatments, such as jump-up spurs. Relying solely on the existing road network will lessen the ability for product removal and will shift treatment methods toward more mastication and hand thinning. This alternative seeks to balance forest restoration with concerns about expanding the existing road network.

Because minimal temporary roads will be constructed, all treatment must occur off of existing roads, limiting the area that can be treated. It is assumed that all treatment will occur within 0.5 miles of existing roads, reducing the available treatment area to 6,325 acres. Table 2 presents the proposed treatment area by vegetation type for Alternative C.

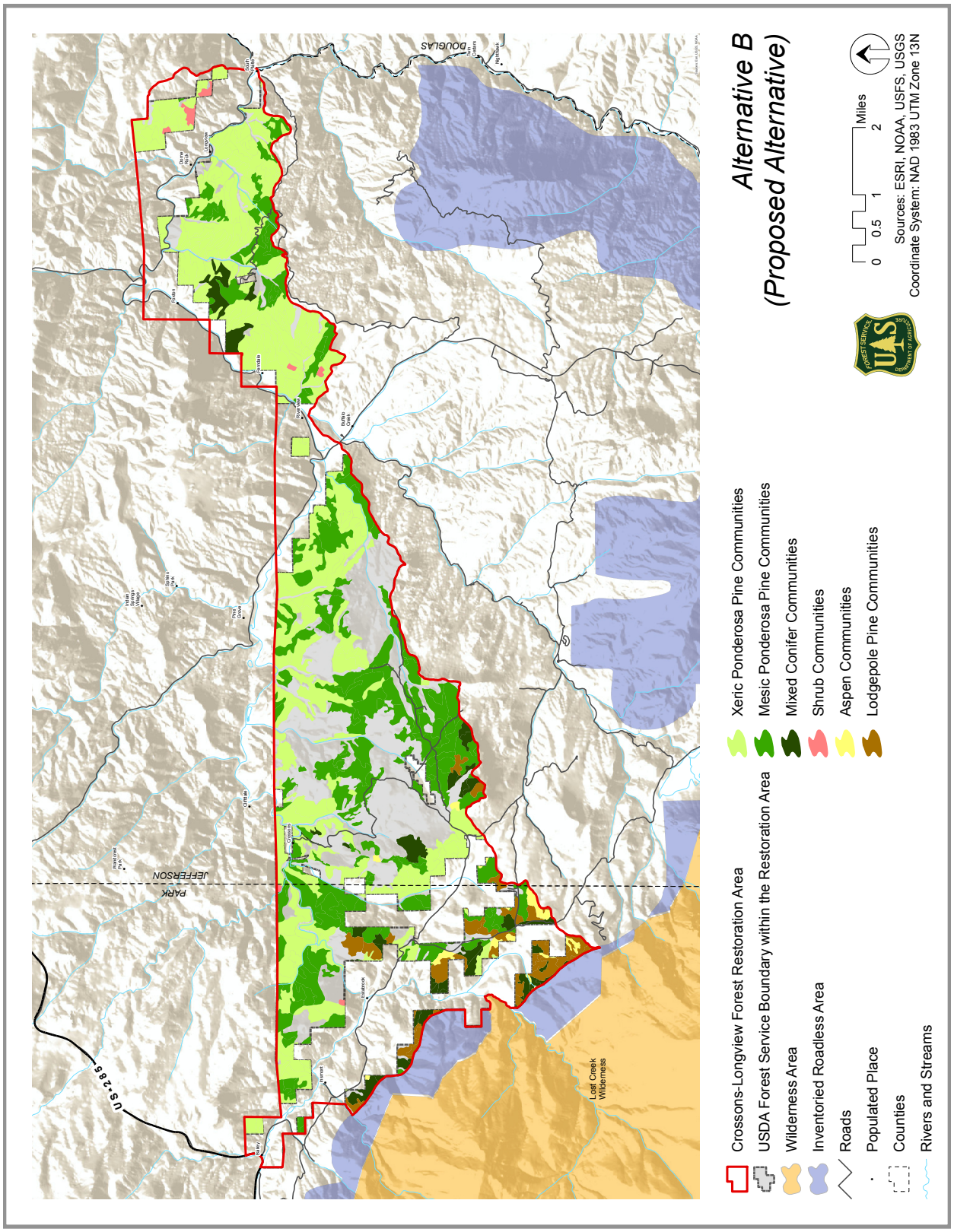

Figure 1. Crossons-Longview Treatment Area Map

Table 2. Crossons-Longview Alternative C - Proposed Treatment Areas

Vegetation Type	Area (acres)	Percent of Total Area Treated (%)
Xeric Ponderosa pine	2,919	46%
Mesic Ponderosa pine	2,500	40%
Mixed Conifer	422	7%
Lodgepole pine	354	6%
Aspen	115	2%
Shrubs	16	<1%
Total	6,326	

2.1 Wildland Urban Interface (WUI)

The National Fire Plan, written in 2001, outlines a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration on Federal, State, and private lands. Goals of the National Fire Plan are to prevent loss of life, reduce firefighter injuries, and lessen damage to communities and the environment from severe, unplanned, and unwanted fires. Two of the main priorities of the Plan include targeting funding towards communities that have a Community Wildfire Protection Plan (CWPP) in place and WUI areas with the potential for reduction in high fire risk (USDA-Forest Service 2001).

In addition, a list of At Risk Communities was published in the Federal Register (August 2001). This list outlines the WUI communities in the vicinity of Federal lands that are at high risk from wildfire. The list was developed so land managers could identify priority areas that would benefit from fuels reduction activity. The following At Risk Communities are located in the Crossons-Longview Project Area: Bailey, Crossons, Dome Rock, Estabrook, Ferndale, Foxton, Insmont, Longview and Riverview (Figure 2).

The WUI is generally described as the zone where structures and other human developments meet and/or intermingle with undeveloped wildland or vegetative fuels (Preparing a Community Wildfire Protection Plan, A Handbook for Wildland Urban Interface Communities March 2004).

2.2 Community Wildfire Protection Plans (CWPP)

There are three fire protection districts, Elk Creek, North Fork, and Platte Canyon Fire Protection Districts, within the Crossons-Longview Project Area (Figure 2). The Elk Creek and North Fork Fire Protection Districts have developed CWPPs. In addition, Jefferson and Park County have both developed CWPPs that cover their

respective portions of the Crossons-Longview Project Area. The four CWPPs cover all the Crossons-Longview Project Area.

The Healthy Forest Restoration Act (HFRA) of 2003 emphasizes the role of community planning and offers a variety of benefits to communities with a Community Wildfire Protection Plan (CWPP) including matching federal grants for fuel reduction projects. A CWPP requires approval by local governments, fire authorities, and the state forest management agencies in consultation with federal land management agencies. CWPP funded projects are directed at private lands and generally not available for projects on federal lands.

The HFRA definition of a WUI is "an area within or adjacent to an at-risk community that is identified in recommendations to the Secretary in a community wildfire protection plan". There are federal lands within the project area that are adjacent to all of the at-risk communities (Figure 2).

3. Regulatory Framework

Agency direction for fuels treatment comes from three regulatory documents listed below. The Crossons-Longview Project was designed to meet the intent of these documents.

3.1 Forest Land and Resource Management Plan (1985)

The Forest Plan was approved in 1984. There have been 34 amendments to the Forest Plan beginning in September 1985 through January 2009.

3.2 National Fire Plan (2001)

Goals of the National Fire Plan are to prevent loss of life, reduce firefighter injuries, and lessen damage to communities and the environment from severe, unplanned, and unwanted fires. Fire Plan priorities include targeting funding towards communities that have a CWPP in place and in WUI areas with high risk reduction potential, collaborative planning involvement with stakeholders, use of third party contracting that supports rural community stability, and obtaining economic use of treated area by-products.

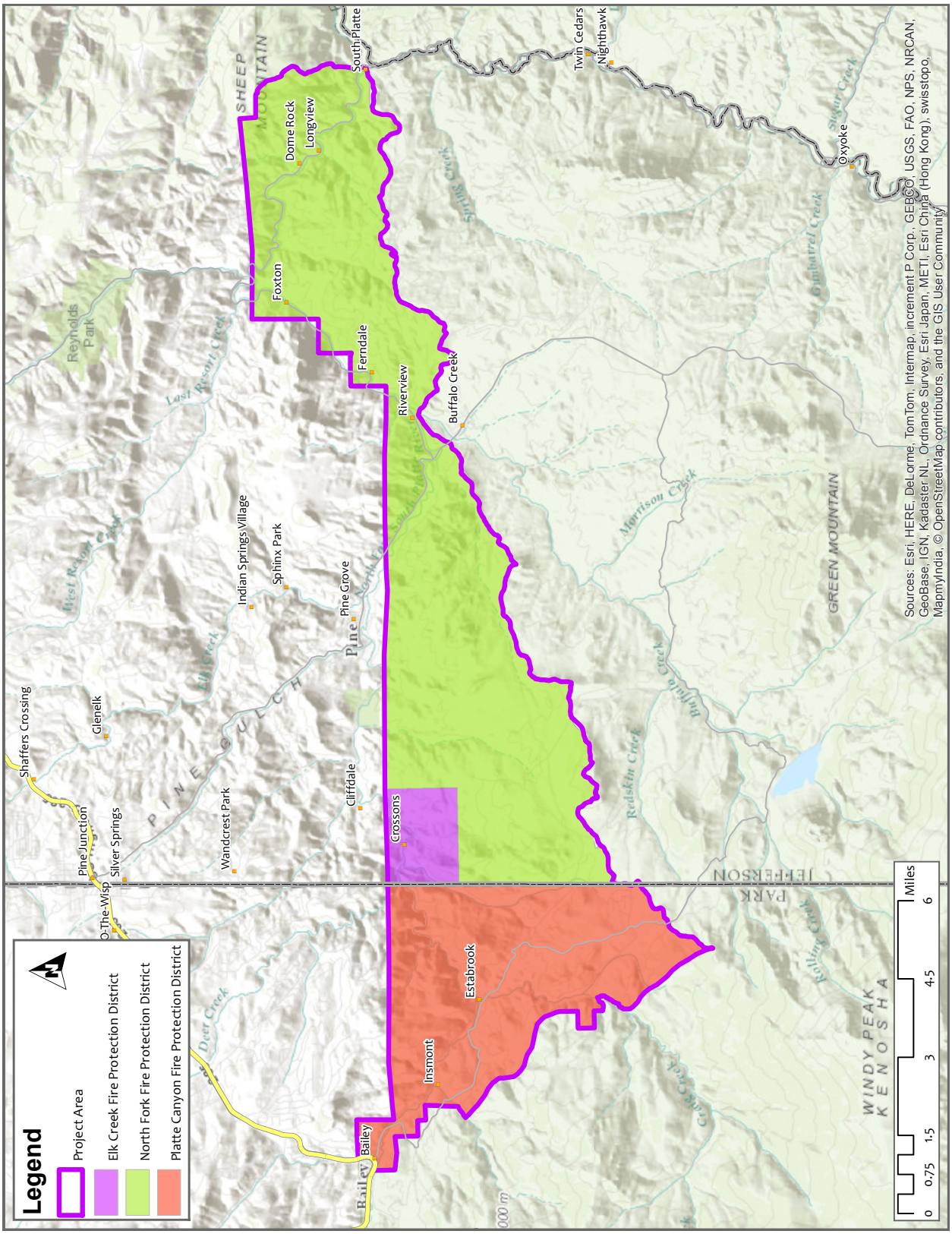

Figure 2. Crossons-Longview Fire Protection District Map.

3.3 Healthy Forests Restoration Act, Title I (2003)

Title I of the HFRA contains provisions for expedited hazardous fuel treatments on some National Forest System and Bureau of Land Management lands at risk of wildland fire and insect or disease epidemics. Lands that qualify for expedited fuel treatments include:

- The Wildland Urban Interface or At Risk Communities especially where a community has developed a Community Wildfire Protection Plan.
- Municipal watersheds that are at risk from wildland fire.
- Areas where windthrow, blowdown, ice storm damage, or the existence or imminent risk of an insect or disease epidemic significantly threatens ecosystem components or resource values.
- Areas where wildland fire poses a threat to, and where the natural fire regimes are important for, threatened or endangered species or their habitat.

The Crossons-Longview project has all the elements listed above. The CWPPs cover the Project Area with several At-Risk Communities adjacent to federal lands. Municipal watersheds for the Denver Water Department and other municipalities are at risk and have been impacted from past fires. There are threats from insects to the Project Area forests. There are some threatened or endangered species that are threatened by wildfire, including the Pawnee montane skipper.

4. Analysis Methods

The ratings for fire hazard increase relative to the amount and continuity of surface and canopy fuels. As the amount of fuel on a given landscape increases, fuel profiles become more horizontally and vertically continuous and the intensity of a wildfire in that landscape would be expected to increase correspondingly. Stands with low crowning index and torching index are the less susceptible to crown-fire initiation and spread.

Changes in structural stage is the criterion used in this analysis for assessing changes in the fire hazard of stands in the Crossons-Longview Project Area. This analysis assigns fire hazard ratings to the various structural stages and uses changes in those ratings to compare Alternative A (No Acton) to changes resulting from the implementation of treatment activities shown in Alternative B (Proposed Action) and Alternative C. The indirect effects of the proposed treatments include lands located not only in the treatment areas but also lands adjacent to the treatments.

Table 3 displays the assigned fire hazard rating for each structural stage represented in the Crossons-Longview Project Area. These ratings are used in the comparison of effects of the alternatives.

Table 3. Fire Hazard Ratings Associated with Vegetation Structural Stages

Structural Stage	Decsription	Estimated Crown Cover	Fire Hazard Rating
1	Grass/Forb	NA	Low
2	Seedlings	<40%	Low
3A	Sapling/Pole	<40%	Moderate
3B	Sapling/Pole	>40%	High
3C	Sapling/Pole	>40%	High
4A	Mid-Aged	<40%	Moderate
4B	Mid-Aged	>40%	Very High
4C	Mid-Aged	>40%	Very High
5	Mature	<40%	Moderate
5	Mature	>40%	Very High

5. Existing Conditions

5.1 Historical Conditions

Fire has historically played a significant role in shaping the fire-adapted ecosystems of the interior western states. At the turn of the 20th Century, selective logging, livestock grazing, and fire prevention and suppression activities began to change the composition, structure, and function of these fire-adaptive ecosystems. Extended human development, fire suppression, prolonged fire exclusion, and climate changes have created denser vegetative conditions in these fire-adapted ecosystems that predispose areas to severe wildfire threats. Historical conditions for the Crossons-Longview Project Area can best be described as areas with wildfires spatially widespread, having significant stand-replacing events.

The historical ponderosa pine forest was likely quite open with fewer trees, greater age diversity between stands, and larger openings than the area displays today. Under historical conditions, studies have indicated that fire typically served to maintain open mature stands, as well as to maintain some areas as openings. Brown et al. (1999) and Kaufmann et al. (2000) provide evidence that frequent, mixed severity fires characterized the ponderosa pine stands before European man settled in the areas (1000 to 1870). Although there were areas of intense fires, these areas were relatively small in extent and critical in creating openings of 20 to 40 acres that were maintained by the dry site conditions until regeneration occurred. The open forest was protected from large-scale fires because of the distance between tree crowns and the openings (USDA

Forest Service, 2002a). Mixed severity fires would have limited the growth of Douglas-fir, which does not tolerate fire well, to sites where fires were infrequent, particularly wetter, north-facing slopes. These fires would also have kept the forest more open by limiting the growth of understory trees.

Frequency and fire patterns created a varied burn pattern that in turn created a sustained vegetative pattern across the landscape. This mosaic pattern would be maintained as the patch-like variations of age classes, densities, and openings caused mixed severity fires. Some stands would have had a multitude of age classes from seedlings to trees more than 400 years old. There were probably few snags (standing dead trees) and cavities in live trees. A few stands would have been nearly even-aged due to stand-replacing fires followed by even-aged regeneration.

One key to the sustainability of the pre-European forest was the open condition. The open forest would have been somewhat protected against large-scale fires because of the distance between tree crowns and larger openings. Openings may have covered 20 to 25 percent of the area, and some of these openings may have persisted for decades due to climatic and seed source limitations. Regeneration would have begun immediately on other burned sites. Therefore, post-fire patterns of regrowth would have resulted in variations both in space and time, contributing to the complexity of the landscape.

5.2 Forest Vegetation

Six forest types have been identified within the project area that are the focus of proposed vegetation treatments (Table 1). A detailed analysis of these vegetation types has been completed in the Crossons-Longview Vegetation Specialist Report (JW Associates 2015).

Some tree planting has occurred in past burned ares within the Project Area. These trees will change the fuels profile in those areas from being ground fire dominated to more mixed severity as the trees grow and become ariel fuels. However, that change will occur slowly over the next 50 years or more.

5.3 Fuels Conditions and Measures

Several measures are used to explain forest condition as it relates to fire hazard and threat from large-scale, high intensity fire. One measure of forest condition is the condition class system created under the National Fire Plan (USDA Forest Service, 2001a). This system describes three condition classes to identify risk conditions within fire regimes. The three condition classes were developed to describe the departure from historic fire regime conditions. Condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire exclusion, timber harvesting, grazing, introduction, and establishment of exotic plant species, insects and disease

(introduced or native), or other past management activities. Table 4 describes the Condition Classes and Table 5 displays the acreages in each of the Condition Classes within the Crossons-Longview Project Area and vegetation treatment target areas. Figure 3 displays the Condition Classes for the Project Area.

Table 4. Condition Class Definitions

Condition class	Attributes	Example management options
Condition Class 1	Fire regimes are within or near an historical range. The risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been significantly altered from their historical range.	Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime.

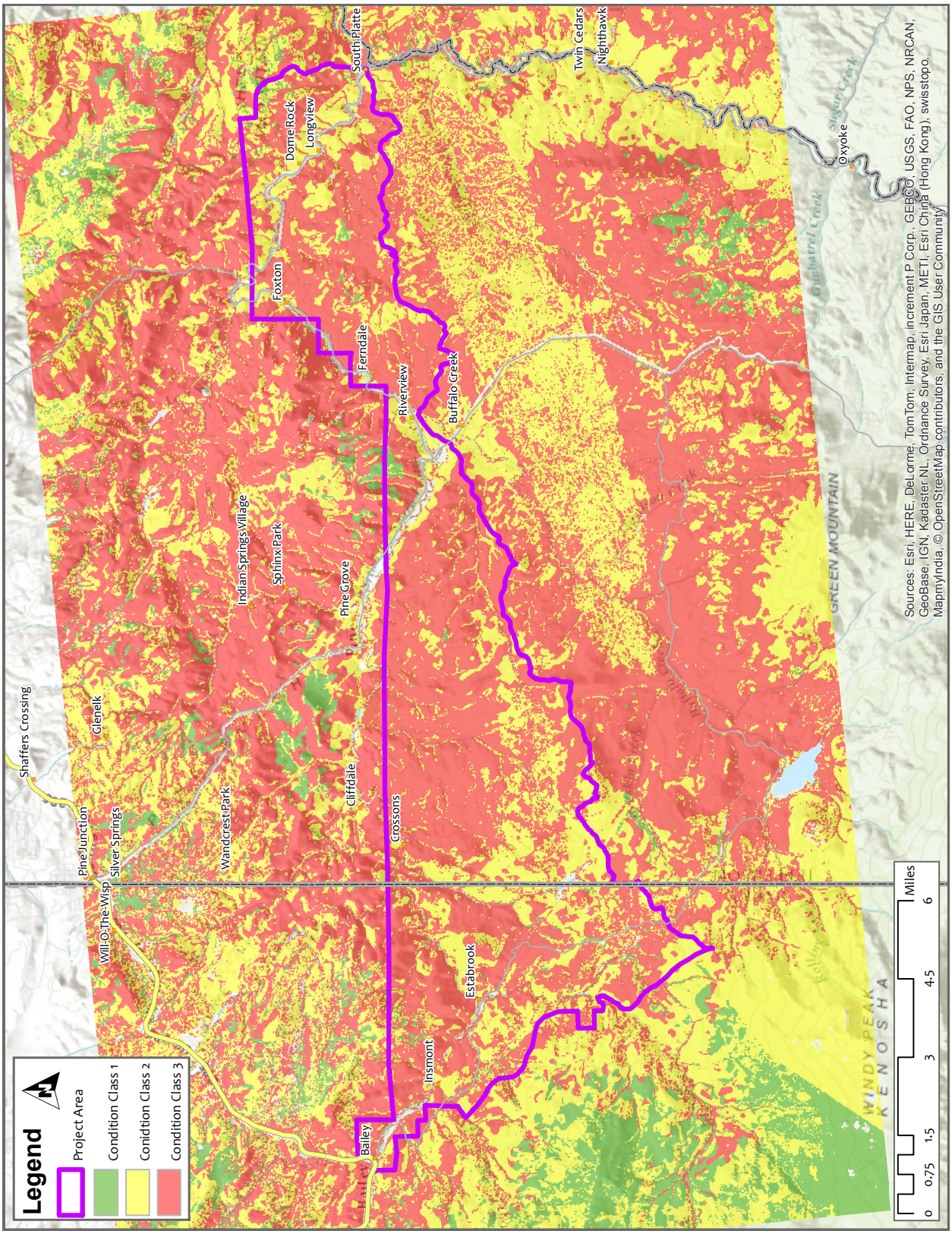

Figure 3. Condition Classes in the Crossons-Longview Project Area.

Table 5. Condition Classes in the Crossons-Longview Project Area[1]

Condition class	Project Area (acres)	NFS Lands (acres)	Vegetation Treatment Area (acres)	Vegetation Treatment Areas (%)
Condition Class 1	298	122	65	1%
Condition Class 2	6,684	3,974	2,456	26%
Condition Class 3	15,725	11,637	7,043	74%
Totals	22,707	15,733	9,564	100%

Condition classes consider canopy base height and canopy bulk density as factors that contribute to crown fire hazard. "*Canopy base height is the lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy. Canopy base height is an effective value that incorporates ladder fuels such as shrubs and understory trees as well as the lower branches of mature trees. Canopy base height is often measured at the lowest height above ground where at least 30 lbs/ac/ft of available canopy fuels is present*" (USDA-Forest Service 2006). The lower the canopy base height is to the ground, the easier it is for a surface fire to become a crown fire. Canopy bulk density is defined as "*the mass of available canopy fuel per unit canopy volume. It is a bulk property of a stand not an individual tree. It is represented as the available canopy fuel load divided by canopy depth*" (Scott and Reinhardt 2001).

There are additional factors such as Torching Index and Crowning Index that are to be taken into consideration with canopy base height, crown bulk density, and surface fuel loading when assessing crown fire initiation and overall fire hazard. Research has shown that crown fire initiation and spread are most influenced by canopy base height, canopy bulk density, and surface fuel loads. Fire behavior and severity depend on the properties of the various fuel (live and dead vegetation and detritus) strata and the continuity of those fuel strata horizontally and vertically (Graham et al., 2004).

Crown fires are part of the mixed severity historic disturbance regime. However, crown fires that have occurred in recent wildfires do not fit into the mixed severity fire regime because they cover large areas with high intensity fire. Historic crown fires were generally limited in scale by open forest conditions. Table 4 shows that the majority of vegetation treatment areas are in Condition Class 3, which means that they have been altered substantially from historic fire regimes.

[1] Note that the acre totals might not match the totals presented for the entire Project Area, etc. due to not all acres being classified in the VCC system.

In addition to the general fuel models, the surface and ladder fuel components are important considerations. The restoration treatments will change canopy base height and crown bulk density that will alter the fuel profile to make the area more resilient to fire. Thinning treatments will open up the canopy and reduce crown bulk density. Treatments that involve understory removal will raise the canopy base height. Surface fuel loads may be increased due to the treatments unless the residual material is removed. Removal can be mechanical (chipping, roller chopping) or with the use of prescribed fire to burn slash piles, or broadcast burning to remove activity fuels. The removal of ladder fuel components would be incorporated into treatments to reduce the potential for crown fire initiation.

5.4 Fire History/Fire Hazard

Fire history is a factor in evaluating fire risk. Six major wildfires have burned partly within or adjacent to the Crossons-Longview Project Area in the last 20 years (Table 6 and Figure 4). Some of these wildfires have been significant in the state of Colorado. The Buffalo Creek Fire in 1996 raised the awareness of the impacts of wildfires on homes, people and water supplies. The Hayman Fire in 2002 is still the largest wildfire in Colorado history at over 135,000 acres.

Table 6. Past Wildfires Within and Adjacent to Crossons-Longview Project Area

Fire Name	Year	Size (acres)
Buffalo Creek	1996	11,900
Hi Meadow	2000	10,800
Snaking	2000	2,312
Hayman	2002	138,114
Lower North Fork	2012	4,140
Lime Gulch	2013	511

Vegetation management and mechanical treatments can be effective in reducing the threat of crown fire (Graham et al. 1999). Treatments that reduce density and change the composition of stands would reduce the probability of crown fire, decrease severity of impacts, reduce the threat to high-value areas, and enhance fire-suppression effectiveness and safety (Pollet and Omi 2002). In forested stands that have developed without regular disturbance, combinations of mechanical harvest/thinning and prescribed fire are the most effective technique for altering the fuels matrix (Graham et al. 2004).

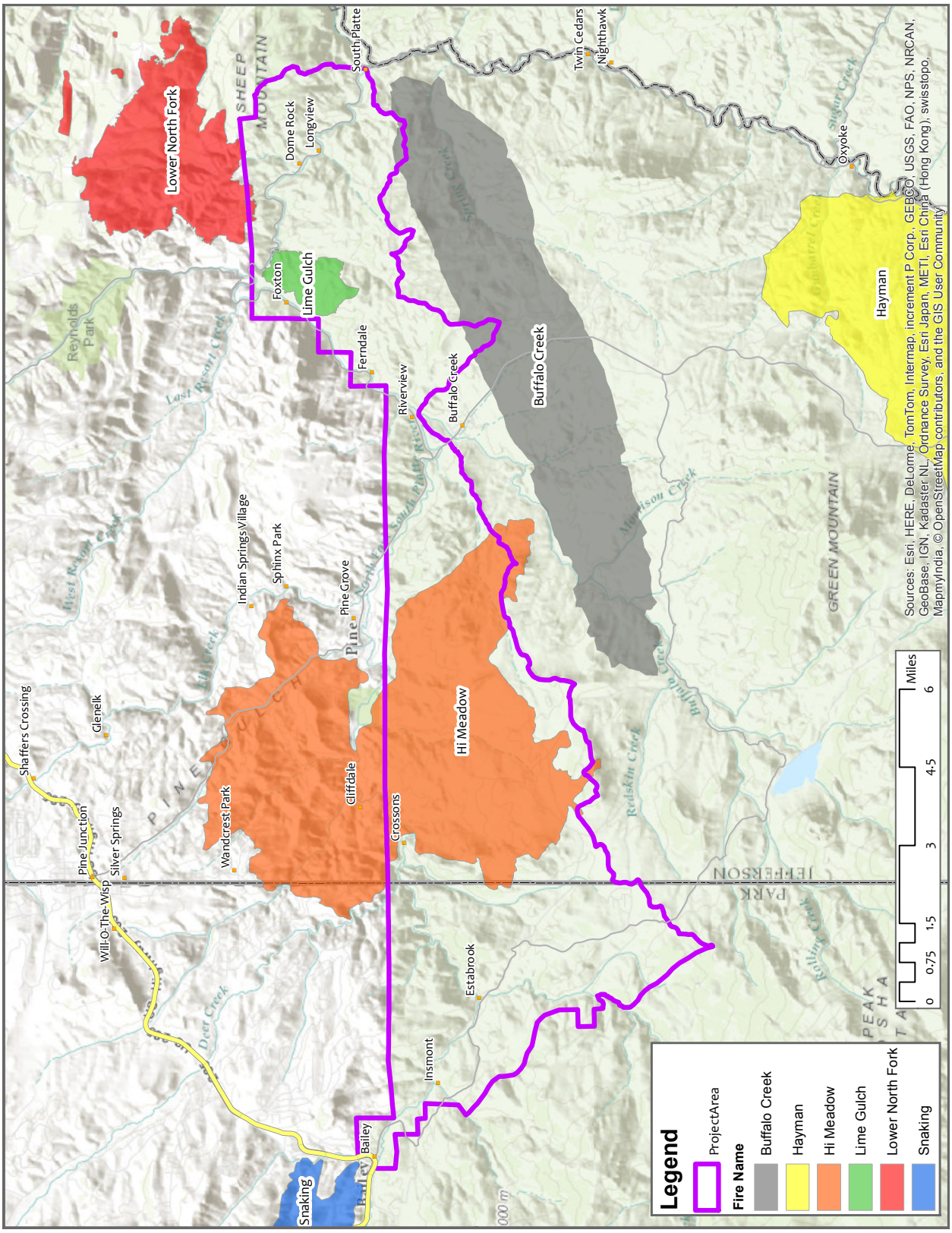

Figure 4. Recent Wildfires Within and Adjacent to Crossons-Longview Project Area.

6. EFFECTS

The proposed vegetation treatments for this project would meet the purpose and need of the project as well as implement a variety of fuels management related objectives as directed under the regulatory framework identified above, and would be based on forest health practices. These treatments would also provide wildland fire suppression advantages and include life/safety/property benefits in and around the WUI. Additional benefits include:

- Reintroducing fire into a fire dependent ecosystem.
- Improving the vigor of treated ponderosa pine stands to increase resistance to mountain pine beetle and pine engraver beetle attacks.
- Returning nutrients back into the soil through prescribed burning and/or mechanical mastication of residual vegetative material.
- Protecting soils and the watershed from the effects of intense wildfire.
- Enhancing plant and animal habitat by releasing hardwood stands from competing conifer encroachment.
- Giving firefighters a safer place to work in the event of a wildfire by breaking up the continuity of the fuels and reducing the threat of a large-scale, high intensity fire in the project area.

6.1 ALTERNATIVE A (NO ACTION)

Only existing and planned activities, previously approved under other NEPA documents, would occur as a result of this alternative. No vegetation management treatments; proposed thinning, creating openings, prescribed burning, and removing trees and fuel breaks would be implemented in the Crossons-Longview Project Area. Ecosystem trends and processes would continue on the current trend. Changes toward the desired future conditions as outlined in the Forest Plan would not occur. Management direction outlined in the National Fire Plan, Healthy Forests Restoration Act, and Community Wildfire Protection Plans would not be met. Areas within the Project Area would be expected to have fire hazard ratings moving towards high and very high, as vegetative biomass increases and stand structures become more complex through annual forest growth. Fire behavior would become more erratic based upon the vegetative changes. When wildfires would occur, such changes in fire behavior would potentially have negative impacts to forest resiliency, watersheds and wildlife habitat, as well as losses to private property within the Crossons-Longview Project Area.

Fire suppression activities would continue; however these suppression activities could become more difficult and dangerous as forest structure complexity increases under this alternative. The Project Area would continue to have a high risk of extreme fire behavior in many locations. Forest health and vigor, and associated resistance to insects and disease would continue to decline.

6.1.1 Direct and Indirect Effects

No direct effects would occur because no actions would be taken under Alternative A (No Action). Indirect effects on forest stand structures and subsequently on wildfire behavior may occur if no treatments are planned or implemented in the Crossons-Longview Project Area. With no treatment, vegetative material would add volume and structure to the fuel matrix. Continued needle and litter deposition would add to the surface fuel loading. Understory vegetation would continue to grow vertically which would essentially lower the canopy base height and overstory crowns would continue to grow together increasing the canopy bulk density of the stands thereby making them susceptible to large-scale, high intensity wildfire. Fire behavior, especially how it relates to surface to crown fire transition in forested stands, would have the potential to become more intense. Crown fire may be more easily sustained once initiated.

Growth of conifers in aspen stands could eventually convert these natural firebreaks into stands, which are unable to alter the direction and rate of fire spread. In some ponderosa pine stands, lack of management and natural disturbances could allow shade-tolerant species such as Douglas-fir to become established in places besides north aspects. Over time, this encroachment would eventually convert the stand from a fire-tolerant species to a fire-intolerant species with low growing crowns that are easily accessed by surface fires making these stands more susceptible to stand replacing fire.

Overall, the indirect effects of no action would combine with effects from other activities in the Crossons-Longview Project Area. As the fire hazard in the Project Area continues to move toward high and very high, the sustainable forest conditions, diverse wildlife habitats, recreational opportunities and sustainable watershed conditions are at greater risk from large-scale, high intensity wildfires. In addition, the risk of property damage, and public and firefighter exposure to wildfire would increase.

Firefighters would be required to take more aggressive actions such as utilizing mechanized equipment and more personnel to keep fires small resulting in increased suppression costs and more negative ecological effects from suppression actions. The probability of a fire escaping initial containment actions may increase, fires may become larger and more intense, more resources may be needed to suppress wildfires. Suppression costs would increase; negative ecological effects would increase, and firefighter exposure to erratic fire behavior would increase.

<u>Ponderosa Pine</u>

The xeric ponderosa pine treatment area includes those areas that would have historically been characterized by very open stand conditions with frequent low intensity fires. Under Alternative A (No Action) the trend toward more closed stand conditions would continue on some of these sites. Table 7 displays the current

structure of these dry site (xeric) stands within the Project Area. Nearly 50 percent of the xeric ponderosa pine is rated as having a very high fire hazard and another 13 percent is rated as a high fire hazard.

In the absence of disturbance, more of this area would progress to the mature stage and develop crown covers of greater than forty percent. Openings would continue to exist where site conditions do not support trees. However, areas that are capable of supporting trees would likely become denser in the absence of fire or tree removal. In the absence of periodic fires, seedlings that establish in the more open areas would grow and develop into small trees. These denser, multi-storied stands would be more susceptible to crown fire propagation because of the ladder fuels provided by the smaller under story trees. Trees within these denser stands would be under additional stress due to more competition for site resources. This additional stress can make these stands more susceptible to injury from insects and disease. Therefore, future fires may burn with high intensity causing impacts to sustainable forest conditions, diverse wildlife habitats, recreational opportunities and sustainable watershed conditions.

Table 7. Existing Fire Hazard Rating for Xeric Ponderosa Pine – Alternative A (No Action)

	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
Crown Cover	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	2	Low	4	Low	2	Moderate	32	Moderate	0	Moderate
> 40	NA	NA	NA	NA	13	High	37	Very High	11	Very High

The potential changes over time within the mesic ponderosa pine stands would be similar to the xeric ponderosa pine under Alternative A (No Action). Younger sapling-pole stands would progress into the mature stage. Without disturbance most of these mesic ponderosa pine stands would develop crown covers over forty percent. Over time these areas would become more homogenous with less variation in density and structural stage.

The mesic ponderosa pine in the project area have a higher percentage of high and very high fire hazard ratings than the xeric ponderosa pine. About 52 percent of the mesic ponderosa pine are rated as a very high fire hazard and another 16 percent are rated as a high fire hazard. Table 8 displays the percentage of each structural stage by crown cover for mesic ponderosa pine. The greater the crown cover closure, the greater risk for crown fire propagation and consequent increase in the Fire Hazard Rating.

Table 8. Existing Fire Hazard Rating for Mesic Ponderosa Pine – Alternative A (No Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	4	Low	1	Low	2	Moderate	25	Moderate	0	Moderate
> 40	NA	NA	NA	NA	16	High	40	Very High	12	Very High

Mixed Conifer

Table 9 displays the current structural stages of the mixed conifer stands in the Project Area. Under Alternative A (No Action), the mixed conifer stands would continue to mature. The amount of Douglas fir would be expected to increase on these sites as the less shade tolerant limber pine and ponderosa pine die out and are replaced by the more shade tolerant firs. In the absence of disturbance, younger stands would not be initiated and the forest stands would become more homogenous. Ladder fuels in the intermediate zone would continue to increase the probability of crown fire initiation. More than 70 percent of the mixed conifer stands are rated as high or very high fire hazard.

Table 9. Existing Fire Hazard Rating for Mixed Conifer – Alternative A (No Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	12	Low	0	Low	5	Moderate	11	Moderate	0	Moderate
> 40	NA	NA	NA	NA	32	High	39	Very High	2	Very High

Lodgepole Pine

Table 10 displays the current structural stages of the lodgepole pine stands in the Project Area. The lodgepole pine stands are all greater than 40 percent crown closure and have high or very high fire hazard ratings. Under Alternative A (No Action), the lodgepole pine stands would continue to mature, although many of them are already at or near their maximum crown density. In the absence of disturbance, younger stands would not be initiated and the forest stands would become more homogenous. In the absence of disturbance, Douglas fir and other shade tolerant species would become a larger component in lodgepole pine stands. These trees would increase ladder fuels and increase the potential for crown fires. The mature lodgepole pine stands would also be at risk from insect outbreaks which could increase the fire hazard in those areas.

Table 10. Existing Fire Hazard Rating for Lodgepole Pine – Alternative A (No Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	0	Low	0	Low	0	Moderate	0	Moderate	0	Moderate
> 40	NA	NA	NA	NA	72	High	28	Very High	0	Very High

Aspen

Under Alternative A (No Action) the amount of aspen cover type within the Crossons-Longview Project Area would likely decline over time. Some of the aspen stands in the area have an established conifer component. In the absence of fire or conifer removal, these sites would eventually convert to conifers as the aspen is shaded out and no new sprouts are initiated. On sites where aspen is self replicating, sudden aspen decline may result in more open grass or shrub dominated communities developing. As the older aspen die out and new aspen sprouts are not produced, shrubs and grasses may become the dominant vegetation in these areas.

Shrublands

Shrublands in the project area are composed of Gambel oak and Mountain-mahogany communities. They occupy only 67 acres in the Crossons-Longview Project Area. The Gambel oak communities have become decadent over time in the absence of fire. Gambel Oak becomes denser as it ages and shades out grasses and other ground cover. Under Alternative A (No Action) these communities would continue to fill in and the oak shrubs would dominate these sites. These shrub-dominated areas do not provide the variety of vegetation that more seral communities do and they may be more prone to more intense wildfires due to the larger amounts of woody fuels. Mountain-mahogany communities have also become decadent over time in the absence of fire. They would continue to mature and increase in density under Alternative A (No Action).

6.1.2 Cumulative Effects

Alternative A (No Action) would not address National, Agency, Forest, or local direction for reducing wildland fuel accumulations beyond existing forest management activities in the short-term. The cumulative effects from not undertaking actions to reduce wildland fuel accumulations would result in increasing fire hazard and risk as fuel accumulations build above current levels. As the fire hazard in the Project Area continues to move toward high and very high, the sustainable forest conditions, diverse wildlife habitats, recreational opportunities and sustainable watershed conditions are at greater risk from large-scale, high intensity wildfires.

6.2 Alternative B (Proposed Action)

A variety of vegetation treatments are proposed under Alternative B (Proposed Action). This alternative would treat up to 9,574 acres in a variety of forest and vegetation types. Tree thinning, prescribed fire and mechanical fuel treatments would all be used to reduce wildland fuels, reduce the wildfire hazard, and maintain the diversity and health of the forest vegetation within the Crossons-Longview Project Area.

6.2.1 Direct and Indirect Effects

Ponderosa Pine Treatment Areas

Under Alternative B (Proposed Action), up to 4,581 acres of xeric ponderosa pine and 3,684 acres of mesic ponderosa pine would be treated, resulting in changes to the structure of many of these forest stands. The treatments would change the fire regime in the created openings from mixed severity to ground fire. Thinning treatments would reduce crown bulk density, ladder fuels and likely canopy base height, resulting in reductions in the potential of crown fire initiation and propagation through large areas of the treated areas. There will remain some areas of dense ponderosa pine that would carry crown fires, but they would be limited in size and not connected to other dense areas. The result would be mixed severity fire regime in the treated areas.

The treatments would result in an increase in ground fuels in many areas, especially areas that are hand treated or masticated. Prescribed fire would be the preferred method for reducing activity fuels. Broadcast burning would be used in areas that have a consistent ground fuel loading without larger fuels present. Areas that are hand treated and create contiguous areas of large fuels would be hand piled and then the piles would be burned after they have cured. The prescribed fire treatments are essential to reducing the fire hazard of the treated areas. In some situations, broadcast burning will be used to complete the treatments by not only reducing ground fuels but also killing seedling or sapling sized trees.

Currently 61 percent of the xeric ponderosa pine forests have crown cover greater than 40 percent and there are few openings or seedling dominated stands within these areas (see Table 7). Following the implementation of the proposed treatments up to 27 percent of the area would be in openings and only about ten percent of the area would have crown covers greater than 40 percent (Table 11).

Table 11. Fire Hazard Ratings for Xeric Ponderosa Pine – Alternative B (Proposed Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	25	Low	2	Low	13	Moderate	45	Moderate	5	Moderate
> 40	NA	NA	NA	NA	1	High	4	Very High	5	Very High

Changes in the xeric ponderosa pine structural stages under Alternative B (Proposed Action) would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the highest fire hazard category of 39 percent (Figure 5). There would also be a reduction in the high fire hazard rating by 12 percent (Figure 5). The low and moderate fire hazard ratings categories would increase substantially. The effects of these proposed treatments would be to move stand conditions toward the open forest conditions that would be more resilient to surface fires and have a lower risk of sustaining a crown fire. Areas that are currently Condition Classes III and II would be moved toward the historical Condition Class I.

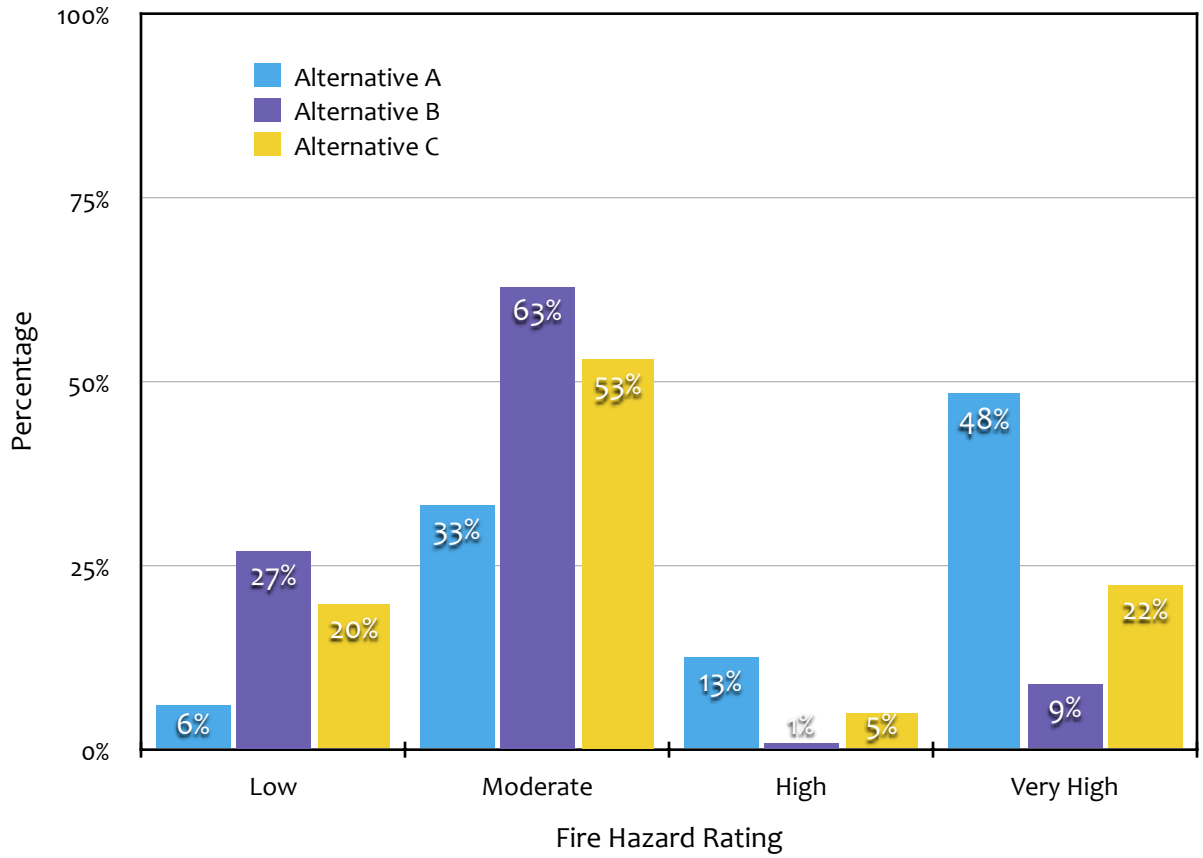

Figure 5. Alternative Comparison of Fire Hazard Ratings of Xeric Ponderosa Pine

The mesic ponderosa pine areas are currently dominated by closed canopied stands with 68 percent of the area having crown covers of greater than 40 percent (Table 8). Like the drier pine sites, there are few openings within the mesic ponderosa pine areas. Following the vegetation treatments proposed under Alternative B (Proposed Action), about 26 percent of the mesic pine treatment areas would be in openings and 20 percent of the area would have crown covers greater than 40 percent (Table 12).

Table 12. Fire Hazard Ratings for Mesic Ponderosa Pine – Alternative B (Proposed Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	25	Low	1	Low	15	Moderate	31	Moderate	7	Moderate
> 40	NA	NA	NA	NA	3	High	10	Very High	7	Very High

Changes in the mesic ponderosa pine structural stages under Alternative B (Proposed Action) would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the very high fire hazard category of 35 percent (Figure 6). There would also be a reduction in the high fire hazard rating by 13 percent (Figure 6). The low and moderate fire hazard categories would increase substantially. The ladder fuels component would be removed in these stands thereby lowering the risk of sustaining a crown fire, a result of fire moving from a surface fire into the crown canopy. Under Alternative B (Proposed Action) the objective to create more open forest conditions and a greater range of residual stand densities would be achieved. Areas that are currently Condition Classes III and II would be moved toward the historical Condition Class I.

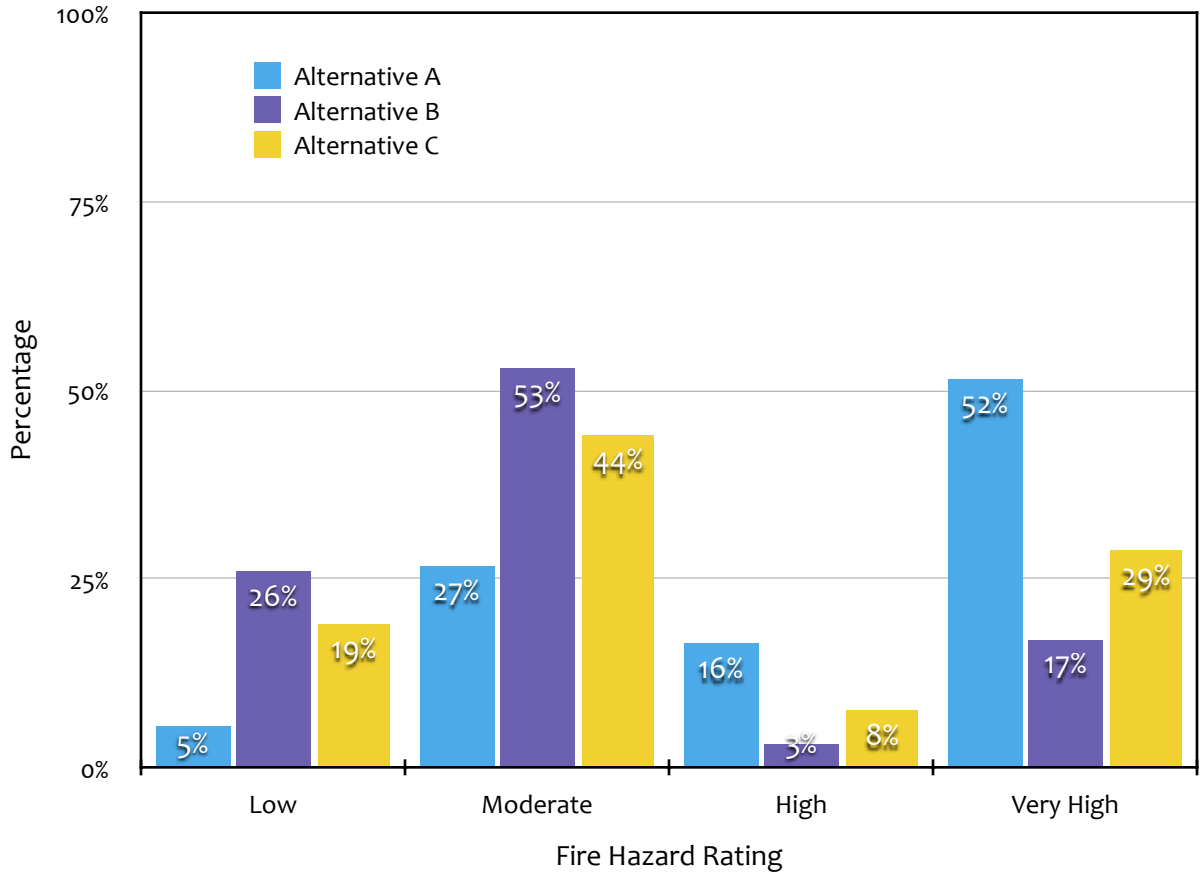

Figure 6. Alternative Comparison of Fire Hazard Ratings of Mesic Ponderosa Pine

Mixed Conifer Treatment Areas

Alternative B (Proposed Action) includes treating up to 603 acres of mixed conifer forest. The treatments would change the fire regime in the created openings from mixed severity to ground fire. Thinning treatments would reduce crown bulk density, ladder fuels and likely canopy base height, resulting in reductions in the potential of crown fire initiation and propagation through large areas of the treated areas. There will remain some areas of dense mixed conifers that would carry crown fires, but they would be more limited in size and not connected to other dense areas. The result would be mixed severity fire regime in the treated areas.

The treatments would result in an increase in ground fuels in many areas, especially areas that are hand treated or masticated. Prescribed fire would be the preferred method for reducing activity fuels. Broadcast burning would be used in areas that have a consistent ground fuel loading without larger fuels present. Areas that are hand treated and create contiguous areas of large fuels would be hand piled and then the piles would be burned after they have cured. The prescribed fire treatments are essential to reducing the fire hazard of the treated areas. In some situations, broadcast burning will be used to complete the treatments by not only reducing ground fuels but also killing seedling or sapling sized trees.

The proportions displayed represent the goal for the prescribed treatments and help illustrate the potential effects of the treatments on the forest structure. Previously these areas most likely were developed under a mixed severity fire regime (Crane, 1982) that would have resulted in a greater variety of stand structures and ages. Currently stand density has increased due to the lack of natural disturbances and suppression efforts. Understory trees, that provide ladder fuels, are present across a larger proportion of the mixed conifer forest than would have existed historically, now leaving the area at high risk for crown fire initiation or extensive crown fires. Currently 73 percent of the mixed conifer treatment areas have a fire hazard rating of high or very high (see Table 9).

Table 13. Fire Hazard Ratings for Mixed Conifer – Alternative B (Proposed Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	25	Low	1	Low	15	Moderate	31	Moderate	7	Moderate
> 40	NA	NA	NA	NA	3	High	10	Very High	7	Very High

Changes in the mixed conifer stands under Alternative B (Proposed Action) would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the very high fire hazard category of 23 percent (Figure 7). There would also be a reduction in the high fire hazard by 29 percent (Figure 7). The low and

moderate fire hazard categories would increase substantially. The effects of treatment would be to decrease the potential for large-scale, high-intensity wildfire. Following treatment, those stands currently in Condition Class III and II would move toward the historical Condition Class I.

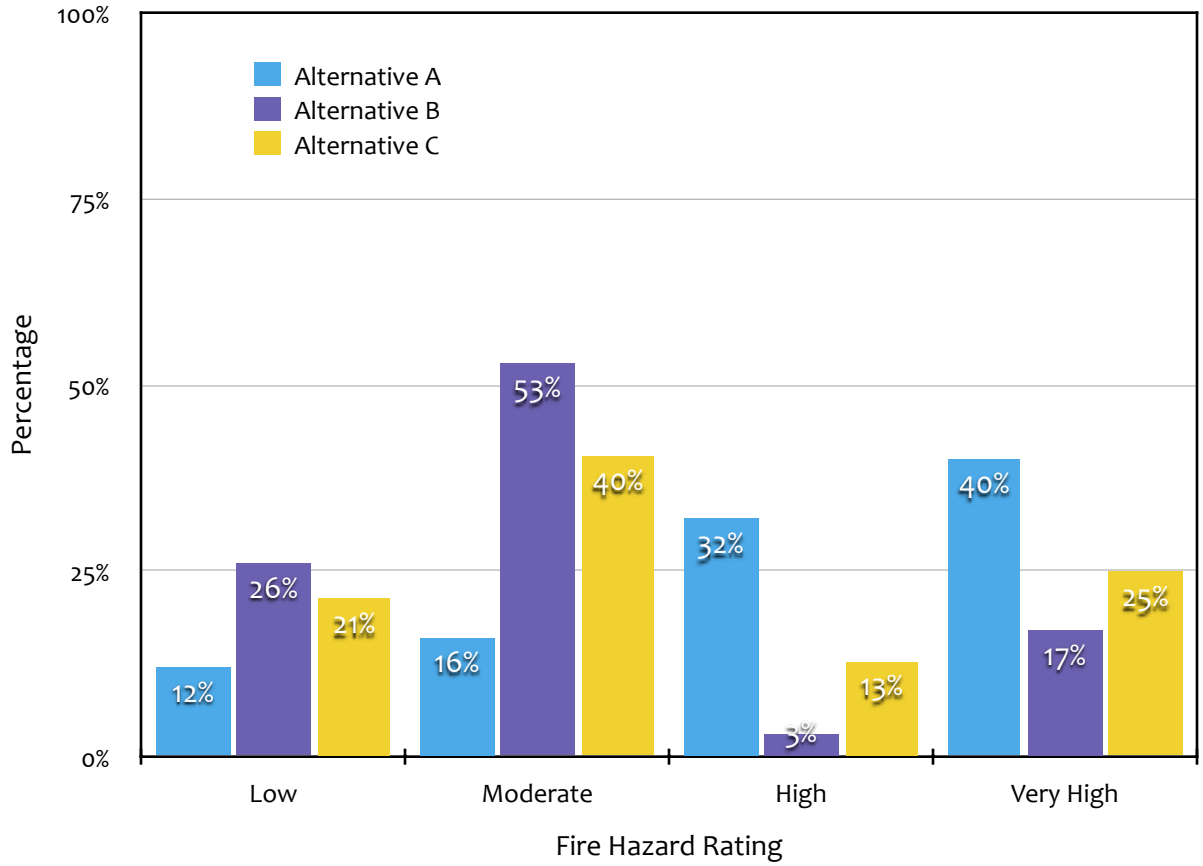

Figure 7. Alternative Comparison of Fire Hazard Ratings of Mixed Conifer

Lodgepole Pine Treatments

Alternative B (Proposed Action) includes treating up to 557 acres of lodgepole pine forest. Thinning treatments would reduce crown bulk density, ladder fuels and likely canopy base height, resulting in reductions in the potential of crown fire initiation and propagation through large areas of the treated areas. There will remain some areas of dense lodgepole pine that could carry crown fires, but they would be more limited in size and not connected to other dense areas.

The treatments would result in an increase in ground fuels in many areas, especially areas that are hand treated or masticated. Prescribed fire would be the preferred method for reducing activity fuels. Broadcast burning would be used in areas that have a consistent ground fuel loading without larger fuels present. Areas that are hand treated and create contiguous areas of large fuels would be hand piled and then the piles would be

burned after they have cured. The prescribed fire treatments are essential to reducing the fire hazard of the treated areas. In some situations, broadcast burning will be used to complete the treatments by not only reducing ground fuels but also killing seedling or sapling sized trees.

The proportions displayed represent the goal for the prescribed treatments and help illustrate the potential effects of the treatments on the forest structure. The actual proportions may vary somewhat from those displayed depending on the conditions found on the ground during implementation. Currently all of the lodgepole pine treatment areas have a fire hazard rating of high or very high (Table 10).

Table 14. Fire Hazard Ratings for Lodgepole Pine – Alternative B (Proposed Action)

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	20	Low	0	Low	15	Moderate	5	Moderate	0	Moderate
> 40	NA	NA	NA	NA	46	High	14	Very High	0	Very High

Changes in the lodgepole pine stands under Alternative B (Proposed Action) would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the very high fire hazard category of 14 percent (Table 14 and Figure 8). There would also be a reduction in the high fire hazard by 26 percent (Figure 8). The low and moderate fire hazard categories would increase substantially. The effects of treatment would be to decrease the potential for crown fire Initiation and sustained crown fire. Following treatment, those stands currently in Condition Class III and II would move toward the historical Condition Class I.

Aspen Treatment Areas

Under Alternative B (Proposed Action) up to 121 acres of aspen would be treated. The objective of the proposed treatments within the aspen stands would be to restore the health and vigor of the existing aspen stands and expansion of their current extent. The proposed treatments include the removal of competing conifer trees and some cutting and burning of aspen to encourage new growth. The effect of these treatments would be to maintain and, in some areas, increase the amount of aspen across the landscape. Aspen does not carry wildfire, so enhancing and expanding aspen would reduce the fire hazard in those areas.

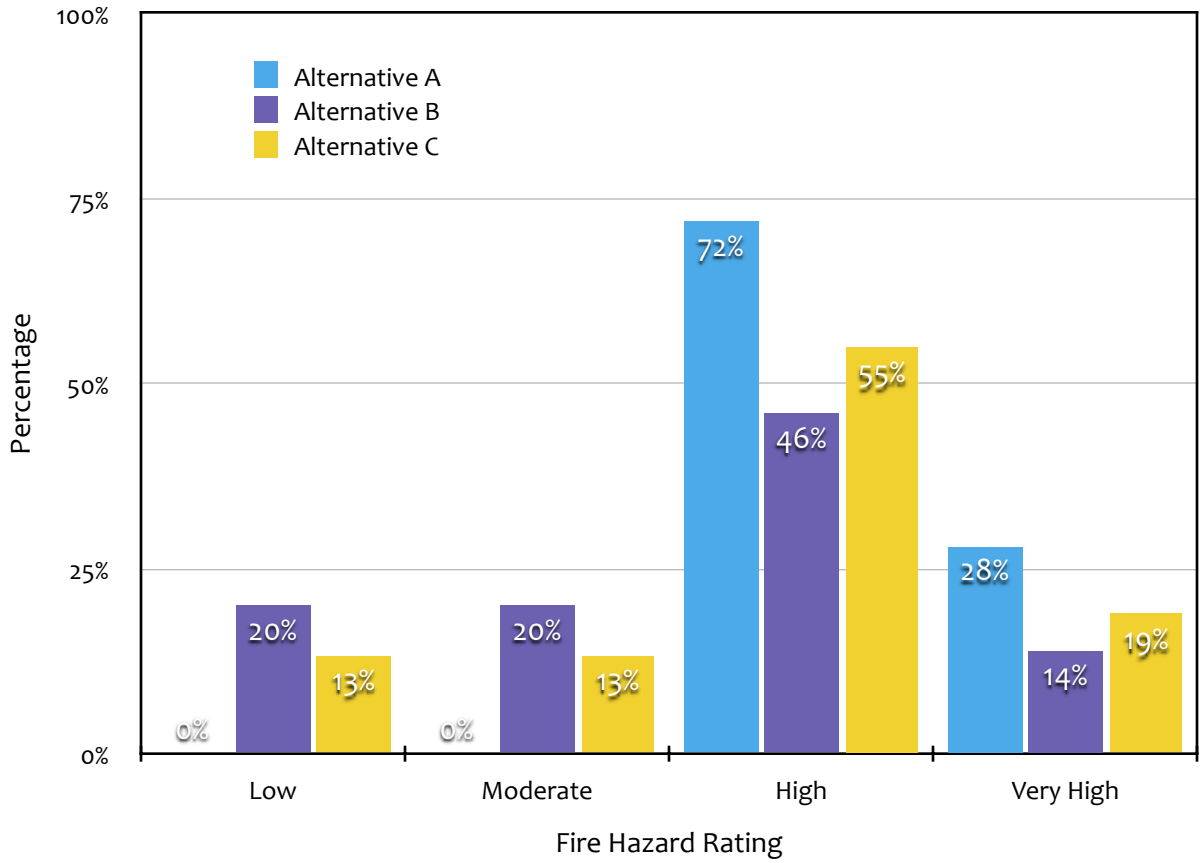

Figure 8. Alternative Comparison of Fire Hazard Ratings of Lodgepole Pine

Shrubland Treatment Areas

Under Alternative B (Proposed Action) up to 28 acres of shrublands would be treated. These treatment areas are of very limited size to change the fire hazard in larger areas, but they could function as fuel breaks, which would expand the effectiveness of those treatments. The materials created from the treatments in shrublands would likely need to be burned, either piled or broadcast burned. The proposed Gambel oak treatments would promote suckering. Therefore, the treatment areas would need periodic maintenance to retain their effectiveness as fuel breaks. Broadcast burning could be used to maintain the shrublands function as fuelbreaks.

Fuelbreaks

Up to 1,000 acres of forest would be treated to create fuelbreaks under the Alternative B (Proposed Action). The fuelbreaks would be part of the treatments identified and described above. Fuelbreaks are defined as a natural or manmade change in fuel characteristics, which affects fire behavior so that fires burning into them can be more readily controlled (National Wildfire Coordination Group, 2008). The main goal of these fuelbreaks

would be to disrupt the continuity of forest fuels at strategic locations and slow the progress of a wildfire or modify its behavior so that fire suppression efforts are more effective.

Fuelbreaks would be created and maintained at strategic locations throughout the Crossons-Longview Project Area. The fuelbreaks would likely be located where natural features, such as ridge tops, or manmade features, such as roads, would increase their effectiveness. Many of these areas may not be accessible from roads and would be created using hand treatments or methods not requiring tree removal. The activities required to construct a fuelbreak would vary depending on the existing conditions, but would likely include thinning, brush and conifer removal and created openings, as well as the use of prescribed fire. Prescribed fire would be used to create the fuel breaks by broadcast burning, and remove activity fuels by burning slash and brush piles.

The effects of these fuelbreaks would be similar to those discussed above for the various forest types. Similar to the openings within the ponderosa pine treatments, these fuelbreaks would be maintained through periodic prescribed fire or mechanical treatments that would maintain the open forest conditions. However, the fuel breaks may be maintained more frequently through re-cutting or broadcast burning every few years.

6.2.2 Cumulative Effects

The effects of treatment actions taken under Alternative B (Proposed Action), combined with the effects of other actions that have occurred in the Crossons-Longview Project Area, would create cumulative impacts on fire hazard. The proposed treatments under this alternative would alter overstory canopies, understories, and surface and ladder fuels that would combine to substantially lower the fire hazard ratings. The reduction of fire hazard would contribute to less erratic fire behavior resulting in more effective fire suppression actions, increased firefighter safety, public safety, and less damage to natural resources. In addition, Alternative B (Proposed Action) would begin moving the vegetative conditions away from current Condition Classes II and III toward the historical vegetative conditions (Condition Class I). The proposed actions under Alternative B (Proposed Action) in combination with more recent and future foreseeable vegetation treatments in surrounding areas would have a cumulative effect by reducing the fire hazard of the Crossons-Longview Project Area, thereby restoring sustainable forest conditions that are resilient to fire, while providing for diverse wildlife habitats, recreational opportunities, and sustainable watershed conditions.

6.3 ALTERNATIVE C

A variety of vegetation treatments are proposed under Alternative C that are very similar to those in Alternative B (Proposed Action) but are limited in scope because minimal temporary roads would be used. This alternative would treat up to 6,326 acres in a variety of forest and vegetation types, focused mainly within 0.5 miles of existing roads. Tree thinning, prescribed fire and mechanical fuel treatments would all be used to

reduce wildland fuels, reduce the wildfire hazard, and maintain the diversity and health of the forest vegetation within the Crossons-Longview Project Area.

6.3.1 Direct and Indirect Effects

Ponderosa Pine Treatment Areas

Under Alternative C, up to 2,919 acres of xeric ponderosa pine and 2,500 acres of mesic ponderosa pine would be treated, resulting in changes to the structure of many of these forest stands. The treatments would change the fire regime in the created openings from mixed severity to ground fire. Thinning treatments would reduce crown bulk density, ladder fuels and likely canopy base height, resulting in reductions in the potential of crown fire initiation and propagation through large areas of the treated areas. There will remain some areas of dense ponderosa pine that would carry crown fires, but they would be limited in size and not connected to other dense areas. The result would be mixed severity fire regime in the treated areas.

The treatments would result in an increase in ground fuels in many areas, especially areas that are hand treated or masticated. Prescribed fire would be the preferred method for reducing activity fuels. Broadcast burning would be used in areas that have a consistent ground fuel loading without larger fuels present. Areas that are hand treated and create contiguous areas of large fuels would be hand piled and then the piles would be burned after they have cured. The prescribed fire treatments are essential to reducing the fire hazard of the treated areas. In some situations, broadcast burning will be used to complete the treatments by not only reducing ground fuels but also killing seedling or sapling sized trees.

Currently 61 percent of the xeric ponderosa pine forests have crown cover greater than 40 percent and there are few openings or seedling dominated stands within these areas (see Table 6). Following the implementation of the proposed treatments up to 20 percent of the area would be in openings and about 27 percent of the area would have crown covers greater than 40 percent (Table 15).

Table 15. Fire Hazard Ratings for Xeric Ponderosa Pine – Alternative C

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	17	Low	3	Low	9	Moderate	40	Moderate	3	Moderate
> 40	NA	NA	NA	NA	5	High	15	Very High	7	Very High

Changes in the xeric ponderosa pine structural stages under Alternative C would reduce the fire hazard of the Crossons-Longview Project Area, although to a lesser extent than Alternative B (Proposed Action). These changes include a reduction in the very high fire hazard category of 26 percent (Figure 5). There would also be a reduction in the high fire hazard rating by eight percent (Figure 5). The low and moderate fire hazard ratings categories would increase. The effects of these proposed treatments would be to move stand conditions toward the open forest conditions that would be more resilient to surface fires and have a lower risk of sustaining a crown fire. Areas that are currently Condition Classes III and II would be moved toward the historical Condition Class I.

The mesic ponderosa pine areas are currently dominated by closed canopied stands with 68 percent of the area having crown covers of greater than 40 percent (Table 8). Like the drier pine sites, there are few openings within the mesic ponderosa pine areas. Following the vegetation treatments proposed under Alternative C, about 19 percent of the mesic pine treatment areas would be in openings and 37 percent of the area would have crown covers greater than 40 percent (Table 16).

Table 16. Fire Hazard Ratings for Mesic Ponderosa Pine – Alternative C

	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
Crown Cover	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	18	Low	1	Low	11	Moderate	29	Moderate	5	Moderate
> 40	NA	NA	NA	NA	8	High	20	Very High	9	Very High

Changes in the mesic ponderosa pine structural stages under Alternative C would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the very high fire hazard category of 23 percent (Figure 6). There would also be a reduction in the high fire hazard rating by eight percent (Figure 6). The low and moderate fire hazard categories would increase. The ladder fuels component would be removed in these stands thereby lowering the risk of sustaining a crown fire, a result of fire moving from a surface fire into the crown canopy. Under Alternative C the objective to create more open forest conditions and a greater range of residual stand densities would be achieved, although to a lesser extent than Alternative B (Proposed Action). Areas that are currently Condition Classes III and II would be moved toward the historical Condition Class I.

Mixed Conifer Treatment Areas

Alternative C includes treating up to 422 acres of mixed conifer forest. The treatments would change the fire regime in the created openings from mixed severity to ground fire. Thinning treatments would reduce crown bulk density, ladder fuels and likely canopy base height, resulting in reductions in the potential of crown fire initiation and propagation through large areas of the treated areas. There will remain some areas of dense mixed conifers that would carry crown fires, but they would be more limited in size and not connected to other dense areas. The result would be mixed severity fire regime in the treated areas.

The treatments would result in an increase in ground fuels in many areas, especially areas that are hand treated or masticated. Prescribed fire would be the preferred method for reducing activity fuels. Broadcast burning would be used in areas that have a consistent ground fuel loading without larger fuels present. Areas that are hand treated and create contiguous areas of large fuels would be hand piled and then the piles would be burned after they have cured. The prescribed fire treatments are essential to reducing the fire hazard of the treated areas. In some situations, broadcast burning will be used to complete the treatments by not only reducing ground fuels but also killing seedling or sapling sized trees.

Table 17 displays the post treatment structural stages for the mixed conifer treatment areas. The proportions displayed represent the goal for the prescribed treatments and help illustrate the potential effects of the treatments on the forest structure. The actual proportions may vary somewhat from those displayed depending on the conditions found on the ground during implementation. Previously these areas most likely were developed under a mixed severity fire regime (Crane 1982) that would have resulted in a greater variety of stand structures and ages. Currently stand density has increased due to the lack of natural disturbances and suppression efforts. Understory trees, that provide ladder fuels, are present across a larger proportion of the mixed conifer forest than would have existed historically, now leaving the area at high risk for large crown fires. Currently 73 percent of the mixed conifer treatment areas have a fire hazard rating of high or very high (see Table 9).

Table 17. Fire Hazard Ratings for Mixed Conifer – Alternative C

	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
Crown Cover	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	25	Low	1	Low	15	Moderate	31	Moderate	7	Moderate
> 40	NA	NA	NA	NA	3	High	10	Very High	7	Very High

Changes in the mixed conifer stands under Alternative C would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the very high fire hazard category of 15 percent (Figure 7). There would also be a reduction in the high fire hazard by 21 percent (Figure 7). The low and moderate fire hazard categories would increase. The effects of treatment would be to decrease the potential for large-scale, high-intensity wildfire. Following treatment, those stands currently in Condition Class III and II would move toward the historical Condition Class I.

Lodgepole Pine Treatments

Alternative C includes treating up to 354 acres of lodgepole pine forest. Thinning treatments would reduce crown bulk density, ladder fuels and likely canopy base height, resulting in reductions in the potential of crown fire initiation and propagation through large areas of the treated areas. There will remain some areas of dense lodgepole pine that could carry crown fires, but they would be more limited in size and not connected to other dense areas.

The treatments would result in an increase in ground fuels in many areas, especially areas that are hand treated or masticated. Prescribed fire would be the preferred method for reducing activity fuels. Broadcast burning would be used in areas that have a consistent ground fuel loading without larger fuels present. Areas that are hand treated and create contiguous areas of large fuels would be hand piled and then the piles would be burned after they have cured. The prescribed fire treatments are essential to reducing the fire hazard of the treated areas. In some situations, broadcast burning will be used to complete the treatments by not only reducing ground fuels but also killing seedling or sapling sized trees.

Table 18 displays the post treatment structural stages for the lodgepole pine treatment areas. The proportions displayed represent the goal for the prescribed treatments and help illustrate the potential effects of the treatments on the forest structure. The actual proportions may vary somewhat from those displayed depending on the conditions found on the ground during implementation. Currently all the lodgepole pine treatment areas have a fire hazard rating of high or very high (see Table 10).

Table 18. Fire Hazard Ratings for Lodgepole Pine – Alternative C

Crown Cover	Grass/Forb		Seedling		Sapling-Poles		Mid-Aged		Mature	
	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating	%	Fire Hazard Rating
< 40	20	Low	0	Low	15	Moderate	5	Moderate	0	Moderate
> 40	NA	NA	NA	NA	46	High	14	Very High	0	Very High

Changes in the lodgepole pine stands under Alternative C would reduce the fire hazard of the Crossons-Longview Project Area. These changes include a reduction in the very high fire hazard category of nine percent (Figure 8). There would also be a reduction in the high fire hazard by 17 percent (Figure 8). The low and moderate fire hazard categories would increase. The effects of treatment would be to decrease the potential for crown fire Initiation and sustained crown fire. Following treatment, those stands currently in Condition Class III and II would move toward the historical Condition Class I.

Aspen Treatment Areas

Under Alternative C up to 115 acres of aspen would be treated. The objective of the proposed treatments within the aspen stands would be to restore the health and vigor of the existing aspen stands and expansion of their current extent. The proposed treatments include the removal of competing conifer trees and some cutting and burning of aspen to encourage new growth. The effect of these treatments would be to maintain and, in some areas, increase the amount of aspen across the landscape. Aspen does not carry wildfire, so enhancing and expanding aspen would reduce the fire hazard in those areas.

Shrubland Treatment Areas

Under Alternative C up to 16 acres of shrublands would be treated. These treatment areas are of very limited size to change the fire hazard in larger areas, but they could function as fuel breaks, which would expand the effectiveness of those treatments. The materials created from the treatments in shrublands would likely need to be burned, either piled or broadcast burned. The proposed Gambel oak treatments would promote suckering. Therefore, the treatment areas would need periodic maintenance to retain their effectiveness as fuel breaks. Broadcast burning could be used to maintain the shrublands function as fuelbreaks.

Fuelbreaks

Up to 1,000 acres of forest would be treated to create fuelbreaks under the Alternative C. The fuelbreaks would be part of the treatments identified and described above. Fuelbreaks are defined as a natural or manmade change in fuel characteristics, which affects fire behavior so that fires burning into them can be more readily controlled (National Wildfire Coordination Group, 2008). The main goal of these fuelbreaks would be to disrupt the continuity of forest fuels at strategic locations and slow the progress of a wildfire or modify its behavior so that fire suppression efforts are more effective.

Fuelbreaks would be created and maintained at strategic locations throughout the Crossons-Longview Project Area. The fuelbreaks would likely be located where natural features, such as ridge tops, or manmade features, such as roads, would increase their effectiveness. Many of these areas may not be accessible from roads and would be created using hand treatments or methods not requiring tree removal. The activities required to construct a fuelbreak would vary depending on the existing conditions, but would likely include thinning, brush

and conifer removal and created openings, as well as the use of prescribed fire. Prescribed fire would be used to create the fuel breaks by broadcast burning, and remove activity fuels by burning slash and brush piles.

The effects of these fuelbreaks would be similar to those discussed above for the various forest types. Similar to the openings within the ponderosa pine treatments, these fuelbreaks would be maintained through periodic prescribed fire or mechanical treatments that would maintain the open forest conditions. However, the fuel breaks may be maintained more frequently through re-cutting or broadcast burning every few years.

6.3.2 Cumulative Effects

The effects of treatment actions taken under Alternative C, combined with the effects of other actions that have occurred in the Crossons-Longview Project Area, would create cumulative impacts on fire hazard. The proposed treatments under this alternative would alter overstory canopies, understories, and surface and ladder fuels that would combine to substantially lower the fire hazard ratings. The reduction of fire hazard would contribute to less erratic fire behavior resulting in more effective fire suppression actions, increased firefighter safety, public safety, and less damage to natural resources. In addition, Alternative C would begin moving the vegetative conditions away from current Condition Classes II and III toward the historical vegetative conditions (Condition Class I). The proposed actions under Alternative C in combination with more recent and future foreseeable vegetation treatments in surrounding areas would have a cumulative effect by reducing the fire hazard of the Crossons-Longview Project Area, thereby restoring sustainable forest conditions that are resilient to fire, while providing for diverse wildlife habitats, recreational opportunities, and sustainable watershed conditions.

6.4 CONSISTENCY WITH FOREST PLAN

Alternative B (Proposed Action) and Alternative C would follow applicable Federal and State laws and related regulations that govern the management of the Land and Resource Management Plan for the Pike and San Isabel National Forests, Cimarron and Comanche National Grasslands; subsequent Amendments to the Forest Plan of which there are 34 dating from September 1985 to the most current of January 2009. This includes but is not limited to the National Fire Plan, Forest Land and Resource Management Plans, Resource Management Area Plans, Manual Direction, Standards and Guides. Smoke Management Plans and Prescribed Fire Plans for site-specific projects would include federal and state regulatory direction of the federal Clean Air Act of 1990, and the Colorado Air Resources Board. Compliance with these plans would occur at the time on-site projects are executed.

Alternative A, the no action alternative, would not make progress towards the objectives of the National Fire Plan.

6.5 Short-term Uses and Long-term Productivity

The fuels management activities, as described under the proposed alternative, would create some short-term disturbances but in the long-term, productivity would be enhanced. The proposed treatments would change the structural stages and related crown fire hazard ratings for forested stands. Potential short-term impacts could occur through disturbance of wildlife and plant habitat, soil disturbance, and stream sedimentation, but the changes in stand composition would reduce the long-term potential for crown fire propagation. Overall, a lower crown fire hazard would result in a more sustainable forest and less environmental damage to wildlife, water, range, recreation, and private lands.

6.6 Unavoidable Adverse Effects

Some minor, short-duration impacts are expected from conducting prescribed burning. Potential impacts would include short-term displacement of the public for public safety during burning and decreases in air quality due to smoke. These issues will be addressed during the preparation of prescribed fire burning and smoke management plans. Mitigation measures would be developed and implemented as needed.

6.7 Irreversible and Irretrievable Commitments of Resources

There are no irreversible or irretrievable effects resulting from the proposed treatments identified under each alternative.

6.8 Other Required Disclosures

There are no disclosures required for this resource report.

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